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| 09/911,264      | 07/23/2001  | Richard J. Markle    | 2000.082800         | 4105             |

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EXAMINER

VINH, LAN

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
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1765

DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/911,264

Applicant(s)

MARKLE ET AL.

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 18-107 is/are pending in the application.
- 4a) Of the above claim(s) 69-106 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32-68 and 107 is/are allowed.
- 6) ☒ Claim(s) 1-8, 12-16 and 18-27, 31 is/are rejected.
- 7) ☒ Claim(s) 9-11 and 28-30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 8, 12, 23-25, 27, 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Dietze et al (US 6,284,986)

Dietze discloses a method for determining the thickness of a layer. This method comprises the steps of:

providing a substrate (col 2, lines 47-48)

forming a layer above the substrate by CVD process (col 2, lines 60-61)

determining the mass of the layer formed above the substrate (col 3, lines 34-35)

establishing/controlling process parameters based upon the weighing of the layer (col 3, lines 55-60; fig. 3)

Regarding claims 2, 24, Dietze discloses using silicon wafer as substrate (col 3, lines 6-7)

The limitation of claims 3, 25 have been discussed above.

Regarding claims 8, 27, Fig. 2 of Dietze shows a scale 20 is used to weight the semiconductor wafer

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Regarding claims 12, 31, Dietze discloses the step of correlating process parameters with measurable weight (fig. 3), which reads on adjusting the parameter based upon the determined weight.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietze et al (US 6,284,986) in view of Lynch et al (US 6,050,138)

Dietze's method has been described above. Unlike the instant claimed inventions as per claims 4, 26, Dietze fails to disclose forming a process layer comprises of silicon dioxide above the substrate

However, Lynch discloses a method for performing bulge testing film comprises the step of forming a process layer comprises of silicon oxide above the substrate (col 19, lines 12-15)

Hence, one skilled in the art would have found it obvious to modify Dietze's method by forming a process layer comprises of silicon oxide above the substrate to protect the silicon substrate during subsequent processing as taught per Lynch (col 18, lines 65-67)

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5. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietze et al (US 6,284,986) in view of Lynch et al (US 6,050,138)

Dietze's method has been described above. Unlike the instant claimed invention as per claims 5-7, Dietze fails to disclose the step of providing a pressure sensor that senses a pressure induced as a result of forming a layer and calculating the weight based upon the sensed pressure.

However, Lynch discloses a method for performing bulge testing film comprises the step of providing a pressure sensor that senses a pressure induced as a result of forming a layer and calculating the weight based upon the sensed pressure.(col 3, lines 15-20; col 10, lines 18-20)

Hence, one skilled in the art would have found it obvious to modify Dietze's method by using a pressure sensor that senses a pressure induced as a result of forming a layer and calculating the weight based upon the sensed pressure as per Lynch because according to Lynch, the pressure sensor is in operative communication with the cavity in the layer formed on the substrate to monitor pressure therein (col 10, lines 18-21)

6. Claims 13-16, 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lynch et al (US 6,050,138) in view of Dietze et al (US 6,284, 986)

Lynch discloses a method for performing bulge testing film comprises the steps of:  
providing a silicon substrate 101 (col 18, lines 49-50)

forming an oxide layer 111 above the substrate by a deposition process (col 18, lines 64-66)

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providing a pressure sensor that senses a pressure induced as a result of forming a layer and calculating the weight based upon the sensed pressure.(col 3, lines 15-20; col 10, lines 18-20)

Unlike the instant claimed invention as per claim 13, Lynch fails to disclose the step of controlling at least one parameter of the deposition process based upon the calculated weight of the process layer.

Dietze discloses a method for determining the thickness of a layer comprises the steps of establishing/controlling process parameters based upon the weighing of the layer (col 3, lines 55-60; fig. 3), depositing additional layer in additional time based on the mass of the layer (col 4, lines 12-15)

One skilled in the art would have found it obvious to modify Lynch's method by adding the step of establishing/controlling process parameters based upon the weighing of the layer as per Dietze because Dietze states that a range of tolerances of acceptable layer masses may be done by calculation or by weighing multiple test substrates (col 4, lines 5-8)

The limitations of claims 14, 16, 19, 20 have been discussed above

Regarding claim 18, Lynch discloses a relationship between the pressure and the width of the membrane (col 2, lines 50-55)

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***Allowable Subject Matter***

7. Claims 9-11, 28-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 9-11, 28-30 the applicants have presented a persuasive argument, see the second and third paragraphs on pages 29-30 of the response, filed 1/27/2004, that the cited prior art of record fails to disclose or suggest the step of stopping said deposition process based upon said determined weight or mass of said process layer/controlling at least one of a duration, a temperature, and a gas flow rate of said deposition process based upon said determined weight or mass of said process layer, in combination with the rest of the limitations of claims 9, 10, 28,29.

Claim 107 allowed. The following is a statement of reasons for allowance: Regarding claim 17, the cited prior art of record fails to disclose the step of providing a pressure sensor in contact with the substrate that sense a pressure induced as a result of forming a process layer. The closest cited prior art of Lynch (US 6,050,138) discloses the step of providing a pressure sensor 51 seen located away from the substrate 57 during the deposition process (fig. 5a).

Claims 32-68 are allowed. The following is an examiner's statement of reasons for allowance: Regarding claims 32, 46, 58, the cited prior arts of record fails to disclose the step of controlling at least one parameter of an etching process based upon determined

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weight or mass of the removed portion of the process layer. The closest cited prior art of Dietze et al (US 6,284, 986) discloses the step of controlling at least one parameter of a deposition process based upon determined weight or mass of the entire process layer (fig. 3). Poris (US 5,625,170) discloses the step of measuring weight loss due to etching of a layer (col 17, lines 52-55)

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Poris (US 5,625,170) discloses a precision weighing method to monitor the thickness and uniformity of etched thin film

### ***Response to Arguments***

9. Applicant's arguments filed 1/27/2004 with respect to the rejections of claims 1, 5-7, 13, 23, 12, 31, have been fully considered but they are not persuasive.

Applicants argue that at no point the reference of Dietz discloses any aspect of controlling at least one parameter of the deposition process based upon the determined weight or mass of the process layer because Dietz is directed to a method to allow efficient monitoring of whether a deposition process has produced acceptable layers, not controlling a deposition process based upon the determined weight or mass of the process layer. This argument is unpersuasive because the passage of "the invention may also be used to monitor at least one of thickness and uniformity of a layer deposited on a substrate by first determined an expected combined mass of the substrate layer" (Dietz in column 4, lines 28-31), as interpreted by the examiner, reads



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on the claimed step of controlling at least one parameter of the deposition process based upon the determined weight or mass of the process layer.

The argument that Dietz does not disclose any aspect of the step of adjusting one or more parameters of a deposition process based upon the determined weight because Dietz discloses that the thickness and uniformity of a test layer is determined for a given deposition process (col 3, lines 58-59). This argument is unpersuasive because while it is true that Dietz discloses that the thickness and uniformity of a test layer is determined for a given deposition process, it is also true that Dietz discloses the step of correlating process parameters (thickness and uniformity) with measurable weight (fig. 3), which reads on adjusting one or more parameter of a deposition process based upon the determined weight.

Applicants further argue that Lynch does not teach monitoring a pressure induced as a result of forming a layer of material because in Lynch, the pressure sensor is used to monitor the pressure created within the cavity 53. This argument is unpersuasive because although the examiner recognizes that Lynch discloses that the pressure sensor is used to monitor the pressure created within the cavity 53, Lynch also teaches that " computer controlled pressure regulator and pressure sensor 51, are used to place ...thin film 57 through predetermined pressure cycle" (col 10, lines 15-18), which reads on monitoring a pressure induced as a result of forming a layer of material.

Applicants arguments with respect to the rejection of claims 9-11, 28-30 have been fully considered and are persuasive. Therefore, the rejections of claims 9-11, 28-30 have been withdrawn (see paragraph 7 above)

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10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471.

The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LV

April 30, 2004